

Claims

1. Control device (1) for non-positive connections, in particular screw connections, wherein the device possesses force-application elements (2a, 2b) and at least one measuring element (3), wherein the measuring element is provided at least in some areas with a layer (4) exhibiting a force sensory effect, characterised in that the surface of the layer has as support profiles flat prominences (5a, 5b) constructed for recording force for recording a force applied by the force application elements.
2. Device according to claim 1, characterised in that the force sensory effect consists in a change of electrical resistance of the layer on changing an applied force.
3. Device according to one of the preceding claims, characterised in that the force-sensitive layer consists of diamond-like carbon-based layers having an amorphous and/or nanocrystalline structure.
4. Device according to claim 1, characterised in that the force-application elements (2a, 2b) are the head (2a) of a set screw (6) and the nut (2b) complementary thereto on the set screw.
5. Device according to one of the preceding claims, characterised in that the measuring element (3) possesses upper (7) and lower sides (8) located opposite one another, wherein the upper and/or lower side are each provided at least in part with a layer which exhibits a force sensory effect.

6. Device according to one of the preceding claims, characterised in that in the areas not covered by a force sensory layer the measuring element is provided with an electrically insulating layer (9) or is uncoated in these residual areas.
7. Device according to one of the preceding claims, characterised in that the measuring element (3) has the shape of a disk with a central hole.
8. Device according to one of the preceding claims, characterised in that the prominences are arranged in annular manner on the surface of the measuring element (see Figures 2b - 3f).
9. Device according to claim 8, characterised in that a plurality of annular prominences (5a, 5b) is provided which are arranged concentrically relative to one another.
10. Device according to one of claims 8 or 9, characterised in that the prominences have a rectangular, triangular or rounded shape perpendicular to the circumferential direction of the annular prominence.
11. Device according to one of the preceding claims, characterised in that a plurality of prominence areas (5a' - 5e') is provided, wherein each of these have a different type and/or number of prominences.
12. Device according to claim 11, characterised in that the prominence areas are separated electrically from one another.

13. Device according to one of the preceding claims, characterised in that the measuring element is accommodated in a sleeve (10) to prevent changes in the position of the measuring element in the event of a movement of the force-application elements (2a, 2b) relative to one another.
14. Device according to one of the preceding claims, characterised in that the measuring element has a core (3') onto which the force sensory (4) coating is applied.
15. Device according to one of the preceding claims, characterised in that the core (3') is composed of hardened or unhardened steel, alloyed steels or stainless steel, of ceramic materials or glass-fibre reinforced plastics etc.
16. Device according to one of the preceding claims, characterised in that the force sensory layer is composed of amorphous carbon.
17. Device according to one of the preceding claims, characterised in that this contains electric connections and an electric circuit for obtaining, transmitting and evaluating signals.
18. Device according to claim 17, characterised in that signal transmission ensues by telemetry.